

and comparatively feeble Agrionidæ feed largely upon such moths and Diptera as can be easily overpowered by them. But, apart from this matter, the amount of information which has so far been accumulated is hardly sufficient to enable us to determine whether much discrimination is exercised by Odonata in the selection of living things as articles of food.

58 Ranelagh Road, Ealing, W.
20th March, 1914.

LIX.—*Descriptions and Records of Bees.*—LIX.
By T. D. A. COCKERELL, University of Colorado.

Halictus hedleyi, Cockerell, var. *a*.

♂.—Hind tibiæ broadly dusky in middle; second abdominal segment red, with a very broad dusky apical shade, third segment red at sides of base, otherwise black, fourth black.

Hab. "Cheltenham, Victoria" (*French*, Froggatt coll. 184).

This differs from *H. hedleyi* only in the reduction of the red colour, and is presumably no more than an individual variation. Toward the end of the original description of *H. hedleyi*, venter is misprinted "vertex."

Halictus vitripennis, Smith, var. *a*.

♀.—First abdominal segment red, with a transverse dark mark.

Hab. Purnong (*S. W. Fulton*, Nat. Mus. Vict. 146).

Halictus dampieri, Cockerell.

♂.—Brisbane, May 13, 1912 (*H. Hackeri*, Queensl. Mus. 64).

Halictus punctatus, Smith.

Croydon (*S. W. Fulton*, Nat. Mus. Victoria, 178, 181, 179, 239, 240, 243).

Halictus erythrurus, sp. n. (*sphecodoides*, subsp. ?).

♀.—Length a little less than 5 mm.

Pubescence scanty, dull white: head ordinary, black, the

convex supraclypeal area faintly greenish; apical half of mandibles red; flagellum rather dull red beneath; front dullish, very minutely sculptured; thorax black, with the mesothorax and scutellum dark olive-green; mesothorax dullish, finely and quite closely punctured, granulated between the punctures; disc of scutellum, except in middle, shining and very sparsely punctured; area of metathorax large, rounded behind, its surface covered with a very fine reticulation. Legs black, with pale hair, the knees and small joints of tarsi more or less ferruginous; hind spur with a very large subbasal tooth; tegulæ pale rufo-testaceous, darkened at base. Wings clear hyaline, stigma and nervures testaceous; outer nervures much weakened, as in *Chloralictus*. Abdomen broad, without hair-bands, bright chestnut-red; the first segment, except the broad apical margin, extending more or less down sides, black. The anterior tibiæ may be red in front, except apically.

Variety *a*.—Rather smaller; mesothorax more shining, dark bluish green.

Hab. Croydon, Australia (*S. W. Fulton*, Nat. Mus. Viet. 177, 182); var. *a*, same data (180).

Closely related to *H. sphecodoides*, Smith, and perhaps only a subspecies, but distinguished by the abdomen being all red except at base, the stigma paler, the flagellum lighter beneath. It appears to be the dry-country representative of *H. sphecodoides*.

It is possible, judging from Smith's description, that the original series of *sphecodoides* included the present species, but the type was restricted in Ann. & Mag. Nat. Hist., Sept. 1904, to the form with the apical part of the abdomen dark.

Halictus caloundrensis, sp. n.

♀.—Length 6 mm.

Robust, with scanty white hair; abdomen without hair-bands or spots; head ordinary, dark bluish green, shining; mandibles dark reddish apically; clypeus partly very bright green, well punctured; a fine sharp keel between the antennæ; front finely longitudinally striate, the striæ before middle ocellus longitudinal (transverse in *transvolans*); flagellum dark, obscure reddish apically; mesothorax very brilliant yellowish green, with curious transverse wave-like plicæ, directed obliquely, so as to meet at an angle in middle line; scutellum peacock-green, the disc smooth and brilliantly shining; area of metathorax with longitudinal plicæ or

ridges, joined at intervals by little transverse ones, so as to produce a cancellated effect; at sides the plicæ run over the edge of the area proper. Legs black, the middle and hind femora dark greenish; hind femora strongly concave beneath; hind spur with three or four short teeth; tegulæ rufous, hyaline in front. Wings clear hyaline; stigma dark brown, nervures sepia; outer r. n. and t.-c. evanescent; first r. n. meeting second t.-c. Abdomen broad, shining steel-blue, with slight purple tints; venter with a curled white floccus.

Hab. Caloundra, Queensland, Oct. 30, 1912 (*H. Hacker*, Queensl. Mus. 83).

H. caloundrensis is of the immediate group of *H. behri*, *transvolans*, and *flindersi*, but is easily separated by the remarkable sculpture of the mesothorax.

Halictus urbanus, Smith.

Stradbroke Island, Oct. 2, 1911 (*Hacker*, Queensl. Mus. 51).

Halictus lanarius, Smith.

Females (*lanarius*, Sm.): Brisbane, Jan. 17, 1912 (*Hacker*; Queensl. Mus. 16); Oakleigh (*Hill*; Nat. Mus. Vict. 69).

Males (*lanuginosus*, Sm.): Whitilesea (*J. A. Kershaw*; Nat. Mus. Vict. 97); Tambourine Mtn., Oct. 27 (*Hacker*; Queensl. Mus. 77); Windsor, Victoria (*French*; Froggatt, 82); Sydney, N.S.W. (*Froggatt*, 117); Timboon (*J. A. Kershaw*; Nat. Mus. Vict. 75).

Halictus hæmatostoma, sp. n.

♂.—Length about $4\frac{3}{4}$ mm.

Robust, with dull white hair; head and thorax black, with labrum, mandibles (except base), and lower margin of clypeus bright ferruginous; mesothorax and scutellum shining dark bluish green; scape black, flagellum bright apricot-colour, slightly dusky above; mesothorax very distinctly but not very densely punctured, the punctures small; middle of scutellum distinctly punctured; area of metathorax small and short, irregularly wrinkled; knees and tarsi bright ferruginous; tegulæ dark reddish. Wings clear, nervures and stigma very light testaceous; outer t.-c. and r. n. evanescent. Abdomen piceous, with the hind margins of the segments pallid; a rather strong constriction between first and second segments. This male has exactly the build of a normal female, with robust body and short antennæ.

Hab. "Windsor, Victoria" (*French*; Froggatt coll. 196).

This is evidently related to *H. inclinans*, Smith, also found at Windsor, but cannot be its male, the mesothorax being much more shiny and sparsely punctured. In both, the first r. n. enters the third s.m. near the basal corner.

Halictus holochlorus, sp. n.

♀.—Length a little over 6 mm.

Green, with dull white hair; head broad, rather dark yellowish green; supra-clypeal area shining, rather bluish green, contrasting with upper part of clypeus, which is pale golden green; lower part of clypeus black; mandibles red, except at base; front very finely longitudinally striate; scape slender, black, red at extreme base; flagellum ferruginous beneath, very dark reddish above; face and front rather conspicuously though thinly hairy; mesothorax peacock-green, quite bright, but granular and with dull surface, microscopically tessellate, with sparse yellow punctures, hardly visible with a lens; scutellum more shining; area of metathorax large, with fine longitudinal ridges, connected at intervals by cross-ridges, producing a minutely cancellate effect; upper part of pleura shining green. Legs black or piceous; knees and small joints of tarsi more or less ferruginous; tegulæ ferruginous. Wings greyish hyaline, nervures and stigma light reddish testaceous; first r. n. meeting second t.-c.; outer r. n. and t.-c. weakened. Abdomen shining dark brassy greenish; apical margins of segments pale and translucent, covering the dark ferruginous bases of the succeeding ones; no distinct curled ventral scopa.

Hab. "Cheltenham, Victoria" (*French*; Froggatt coll. 179).

This is readily known from *H. urbanus* by the light reddish stigma and green abdomen. From *H. floralis* it is known by the larger size and other characters.

Halictus hackeriellus, sp. n.

♂.—Length about 5 mm.

Like *H. kestereni*, differing as follows:—Head yellowish green; mesothorax dull brassy, scutellum the same colour, but shining, contrasting with the bluish-green postscutellum and metathorax (but the area is not at all blue, as it is in *kestereni*); fourth antennal joint conspicuously longer than broad (not longer than broad in *kestereni*); front longitudinally striate. As in *kestereni*, the first r. n. enters base of third s.m.

This is easily known from the male of *H. dampieri* by the smaller size, much shorter antennæ, and absence of a yellow band on clypeus.

Hab. Brisbane, May 13, 1912 (*H. Hacker*, Queensl. Mus. 65).

Halictus bicingulatus, Smith.

♀.—Sydney, N.S.W., Nov. 29 and Dec. 1, 1910 (*Froggatt*, 131, 119); Kenthurst, N.S.W., Feb. 1904 (*Gallard*; *Froggatt* coll. 126); Brisbane, Nov. 5 and 25, 1905 (*Froggatt* coll. 166, 167).

The male from Kelvin Grove, Brisbane, Nov. 27, 1911 (*Hacker*; Queensl. Mus. 46), is like *H. leai*, except that the abdomen is black, without bands or spots.

Halictus peraustralis, Cockerell.

Sydney, N.S.W., Dec. 1, 1910 (*Froggatt*, 113, 130); Stradbroke I. (*Hacker*, Queensl. Mus. 53).

Halictus tertius, Dalla Torre (*rufipes*, Sm.).

Croydon (*S. W. Fulton*, Nat. Mus. Victoria, 267, 268).

With the above material before me I am able to revise the *H. bicingulatus* group, and separate the females of the species as follows:—

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| Wings reddish, costal region not blackened; disc of mesothorax finely and densely, but distinctly punctured | 1. | |
| Wings with the costal region conspicuously suffused with blackish; mesothorax differently sculptured | 2. | |
| 1. Hind margins of abdominal segments hardly or not reddened | | <i>bicingulatus</i> , Smith. |
| Hind margins of abdominal segments broadly ferruginous | | <i>bicingulatus</i> , var. <i>leai</i>
[<i>H. leai</i> , Ckll.). |
| 2. Disc of mesothorax glaucous, shining, sparsely punctured; scape and lower margin of clypeus dark or obscure reddish | | <i>tertius</i> , D. T. |
| Disc of mesothorax dull, appearing minutely granular under a lens; scape bright ferruginous, lower margin of clypeus broadly red | | <i>peraustralis</i> , Ckll. |

H. peraustralis has a patch of very bright orange tomentum on the postscutellum, which is absent from *H. tertius*. In 1904 I placed *tertius* as a synonym of *bicingulatus*, having compared specimens in the British Museum. Smith evidently confused the species of this group, the types of the

two he described not being in the British Museum. A specimen of supposed *bicingulatus* before me, from Smith's collection, is *peraustralis*. Smith's descriptions are, however, sufficiently exact, and I have no doubt of my identifications. When I described *H. leai* as a distinct species I was misled by the supposed *bicingulatus* from Smith's collection. Male *H. leai* shows the broad red plate, characteristic of the *hedleyi* and *tasmaniae* group, on the apex of abdomen. A male *leai* was taken at Croydon by S. W. Fulton (Nat. Mus. Vict. 156).

Halictus griseovittatus, sp. n.

♀.—Length about $7\frac{1}{2}$ mm.

Black, robust, with dull white hair; tarsi reddish at apex, sometimes legs dark reddish; mandibles very obscurely reddish subapically; flagellum black or distinctly reddened apically; head broad; clypeus and supraclypeal area brilliantly shining, with large punctures; sides of face glistening, but middle and upper part of front perfectly dull, with exceedingly minute sculpture; a raised line running downward from middle ocellus; mesothorax shining, but strongly and quite closely punctured; scutellum with minute irregular punctures; area of metathorax semilunar, very finely wrinkled except near the margin, which is only moderately shining; sides of truncation not sharp or angular. Legs with white hair, very pale yellowish or fulvous on inner side of tarsi: hind spur with a single stout oblique tooth a little before the middle, and beyond this a very long low lamina or keel; tegulae picuous. Wings greyish hyaline, stigma dark rufo-picuous, nervures sepia; outer t.-c. and r. n. much weakened; first r. n. entering apical corner of second s.m. or meeting second t.-c. Abdomen shining, very minutely punctured; bases of segments with bands of pale greyish tomentum, broad and entire on third and fourth, mainly at sides on second; caudal rima pale greyish or brownish; venter with white hair, but no curled scopa.

Hab. Brisbane, Queensland; the type from Kelvin Grove, Jan. 15, 1912 (*H. Hacker*; Queensl. Mus. 27); others from Sunnybank, Sept. 12, 1911, and Logan Road, Sept. 18, 1911 (*Hacker*; Queensl. Mus. 4, 26); also three from Mackay, Queensland, March and April 1900 (*Turner*, 1079).

A distinct species, rather like a small edition of *H. repræsentans*, but with quite different metathorax.

Halictus instabilis, sp. n.

♀.—Length about 8 mm.

Black, robust, with greyish-white hair, mixed with fuscous on vertex, mesothorax, and scutellum; mandibles very faintly reddish subapically; clypeus shining, with irregular, not very large punctures, and no median depression; sides of front glistening, but middle broadly dull black, excessively closely punctured; flagellum dark; anterior angles of prothorax rather prominent; mesothorax shining, with very fine but distinct punctures; scutellum broad and flattened, very minutely punctured; area of metathorax rather short, well defined, finely plicate, with a band of subbasal fine connecting ridges; in the whole middle area the plicæ are very fine and irregular, and the surface between them is minutely pitted; posterior truncation not sharply defined at sides; pleura very hairy. Legs piceous, with glistening light hair, the hind tibiæ with a band of greyish-fuscous hair on outer side; hind spur like that of *H. griseovittatus*; tegulæ piceous, with a large rufous spot. Wings dusky, greyish, stigma and nervures dull reddish, second s.m. higher than broad, first r.n. meeting second t.-c. Abdomen broad, shining, very finely punctured, bases of segments with greyish-white tomentum as in *H. griseovittatus*, but the bands have a slightly ochreous tint.

Hab. Croydon, Victoria (*Miss A. M. Fullon*; Nat. Mus. Vict. 77).

Variety *a*.

Stigma clearer red; second s.m. very broad, broader below than high; wings slightly reddish; area of metathorax longer.

Hab. "Windsor, Victoria" (*French*; Froggatt coll. 191).

Variety *b*.

Wings practically as in variety *a*, with broad second submarginal cell; postscutellum longer, subangulate behind; area of metathorax sharply defined, with stronger plicæ.

Hab. Victoria, Sept. 1901 (*C. F.*; Turner coll.).

Closely related to *H. griseovittatus*, but larger, with the bands on the abdomen differently coloured. Possibly variety *b* is a distinct species, but I hesitate to separate it, especially since var. *a* is intermediate between it and the type.

Halictus representans, Smith.

Bacchus Marsh, Nov. 5 (*F. L. Bellinghurst*; Nat. Mus. Vict.); Emerald, Victoria, Nov. 19, 1903 (*J. A. Kershaw*; Nat. Mus. Vict.).

Halictus orbatus, Smith.

Fern Tree Gully (*R. F. Spry*; Nat. Mus. Vict. 252); Victoria, Sept. 1901 (*C. F.*; Turner coll.).

I cannot quite clearly separate *H. conveexus*, Smith, from this, but actual comparison of types would, perhaps, show good characters.

Halictus sturti, Cockerell.

Mackay, March 1900 (*Turner*).

Halictus cyclognathus, sp. n.

♂.—Length not quite $4\frac{1}{2}$ mm.

Black, with scanty greyish-white hair; head very large and broad; cheeks broad and flattened, angled behind; mandibles long, strongly curved, cream-coloured, red apically; clypeus with an apical cream-coloured band, not approaching orbits; supra-clypeal area shining; front dullish, somewhat shining; antennæ rather long, black; mesothorax and scutellum shining, with sparse minute punctures; area of metathorax rugose and opaque, with a shining rim; mesopleura shining; anterior tibiæ ferruginous, with a large dark patch, middle tibiæ red at extreme apex and base; tarsi ferruginous, the hind ones dusky; tegulae reddish. Wings clear, brilliantly iridescent, nervures and stigma ferruginous; first r. n. joining second s. m. a short distance before apex; outer r. n. and t.-c. weakened. Abdomen short for a male, shining black, thinly hairy, not spotted or banded. Microscopical characters:—Front striate (very obliquely at sides above), with punctures between the striae; middle of mesothorax minutely tessellate between the punctures, at sides and in front lineolate; disc of scutellum hardly at all punctured; area of metathorax irregularly subreticulate; punctures of abdomen very minute, not at all dense.

Hab. Croydon, Australia (*S. W. Fulton*; Nat. Mus. Victoria, 200).

Quite unique, but apparently allied to the green *H. pur-nongensis*, having a similar head.

Halictus seductus, sp. n.

♀.—Length about 10 mm.

Black, robust, with greyish-white hair, mixed with fuscous on vertex and mesothorax; mandibles entirely black; flagellum very obscurely brownish beneath. Legs black, with white hair, a band of fuscous hair on outer side of hind tibiæ; clypeus strongly punctured and more or less striate; front dull; mesothorax roughened and strongly punctured, dull, with the disc somewhat shining; scutellum rough, but somewhat shining; area of metathorax sharply defined, strongly striate, produced and pointed in middle behind; lateral margins of truncation sharply defined; hind spur appearing simple, its hind margin very feebly microscopically nodulose; tegulæ piceous. Wings smoky hyaline, stigma and nervures dusky ferruginous; second s.m. very broad, receiving first r.n. well before end; outer t.-c. and r.n. very weak. Abdomen shining, not distinctly punctured, lateral basal margins of second and third segments with bands of white tomentum, and a similar band on fourth hidden under margin of third; apex with fuscous hair; venter with glistening white hair, but no curled scopa. Microscopical characters:—Front striate-punctate; sides of mesothorax cancellate, passing in the middle into oblique wave-like rugæ; punctures of second abdominal segment excessively small, nowhere dense.

Hab. "Windsor, Victoria, 1909" (*French*; Froggatt coll. 93).

Resembles *H. representans*, Sm., but easily known by the sculpture of the mesothorax. The microscopical characters and larger size readily separate it from *H. gilesi*, Ckll.

Halictus circumdatus, sp. n.

♀.—Length about 8½ mm.

Black, shining, with thin greyish-white hair; mandibles red apically; flagellum dark, with a very faint reddish tint beneath; small joints of tarsi more or less reddened; hair of vertex all pale, but that of scutellum and mesothorax mixed with fuscous; head broad; clypeus shining, with strong irregular punctures; front dull in middle, glistening at sides; mesothorax shining, strongly but not very densely punctured; scutellum very irregularly punctured, some of the punctures very minute, others large, and a median slender groove; area of metathorax concave, shining, strongly longitudinally plicate, sharp-edged, with the apical marginal area smooth and shining, depressed in middle; mesopleura

strongly obliquely striate. Legs with light hair, pale fuscous on posterior side of hind tibiæ; tegulæ piceous, with a rufous spot. Wings dusky, nervures and stigma dusky reddish; second s.m. broad, receiving first r. n. near end; outer t.-c. and r. n. weakened. Abdomen rather elongate, pure black, shining, very finely punctured, bases of second to fourth segments with dense bands of clear white tomentum, visible only as triangular lateral patches on second; a long narrow caudal plate; hair of apex fuscous; long white hair of venter somewhat curled.

Hab. "Rutherglen, Victoria" (*French*; Froggatt coll. 174).

Resembles *H. representans*, but easily separated from this and from *H. seductus* by the character of the metathoracic enclosure. There is a strong resemblance to *H. costulatus*, Kriechb. (Mark Brandenburg, Falkenberg, June 6, 1875; Gerstaecker coll.).

Halictus sanguinipes, sp. n.

♂.—Length about 8 mm.

Black, with bright chestnut-red legs; clypeus with a very broad pale yellow band, pointed at each end, and with an upwardly-directed point in middle; mandibles black; flagellum very obscurely reddish beneath; hair of head and thorax dull white below, faintly brownish dorsally; front dull and minutely granular, even at sides; mesothorax rough, glistening; scutellum brilliantly shining, with irregular punctures; area of metathorax very long, irregularly wrinkled; truncation small, with sharp lateral margins; tegulæ piceous, with a rufo-testaceous spot. Wings reddish, more dusky at apex; stigma and nervures ferruginous; second s.m. rather narrow; first r. n. joining second t.-c.; outer nervures strong. Abdomen black, shining, very finely punctured, without hair-bands or spots, clavate in form, narrowing basally; red apical plate extremely broad, truncate, faintly emarginate in middle. The coxæ and trochanters are black, contrasting with the red femora. The front is microscopically striate, with coarse punctures between the striæ.

Hab. "Windsor, Victoria" (*French*; Froggatt coll. 182).

Close to *H. bicingulatus*, but easily separated by the clavate abdomen, the colour of the tegulæ, and the area of the metathorax.